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Osmolality of CSF in inflammatory diseases of central nervous system

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Background: Diseases of the central nervous system (CNS) still represent a significant medical problem. Diagnosed in a timely manner is an essential condition for a favorable course and outcome of disease. Osmolality of serum and cerebrospinal fluid (CSF) change in various CNS diseases can be important for early and differential diagnosis.

Methods: A prospective study sample (n = 160) distributed according the etiology in 8 groups: 1. Purulent bacterial encephalitis (PBE), 2. Purulent meningitis (PM), 3. Tuberculous meningitis (TM), 4. Viral encephalitis (VE), 5. Viral meningitis (VM), 6. Neurological disease (N: Guillain–Barré syndrome, multiple sclerosis) 7. Neurosurgical disease (NS: subarachnoid hemorrhage, brain tumors), 8. Meningismus (M: control group). The outcome of the disease were divided into 3 groups: healed, recovered and deaths. Osmolality of plasma and CSF were determined by osmometry in regard to the freezing-point depression.

Results: The average age of the examined sample of patients was 33.42 years +/- 21.19. 53.2% males and 46.8% females. Observing outcome showed cure in 60% of patients, 20.2% were recovered patients and 19.8% died. Determined mean value of blood osmolality and CSF in patients with PBE (282.95, 281.35 mOsm/kg), PM (282.75, 279.75 mOsm/kg), TM (274.85, 271.35 mOsm/kg), VE (282.50, 278.95 mOsm/kg), VM (284.50, 284.90 mOsm/kg), N (285.10, 290.35 mOsm/kg), NS (286.95, 288.45 mOsm/kg). M (291.40 mOsm/kg). Osmolality of blood/CSF in deaths were: in PBE 280.33/279.17 mOsm/kg, in PM 290.00/283.50 mOsm/kg, in TM 269.67/259.00 mOsm/kg; in VE 274.83/271.50 mOsm/kg, in N 281.50/291.50 mOsm/kg, in NS 287.45/289.82 mOsm/kg.

Conclusion: There is no significance in the gender distribution among the examined groups ($p > 0.05$). There is a high difference in the values of osmolality in serum and CSF of patients between groups ($p < 0.001$).) Osmolality values of blood and CSF were highest in the control group and lowest in the group of patients with bacterial infections of the CNS. There was a significant correlation between blood osmolality and CSF patients in all groups ANOVA ($p < 0.001$).) In VE patients is found a significant correlation between the osmolality of blood and CSF osmolality in relation to the outcome of the disease ($p < 0.005$). Patients with lower values had worse outcome.

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Phenol-auramine versus modified kinyoun's acid-fast stains for detection of coccidia parasites

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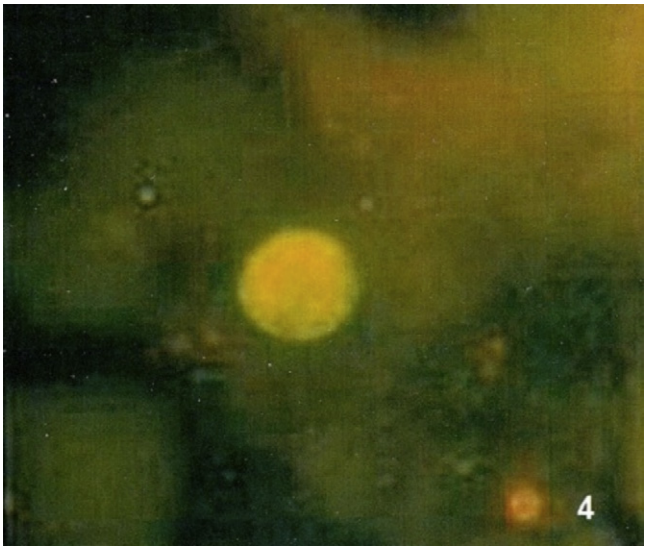
Background: Enteric protozoa have emerged as important opportunistic parasites and can cause fatal infections in immunocompromised patients. Since their line of treatment being different, an accurate identification is necessary. In this study, the phenol-auramine stain was compared with acid-fast Kinyoun's stain for detection of the coccidia parasites in faecal samples from immunocompromised patients. The comparison was on the basis of the attributes which are number of detected cases, sensitivity, specificity, time required for the procedure and screening, ease of performance and interpretation, and cost.

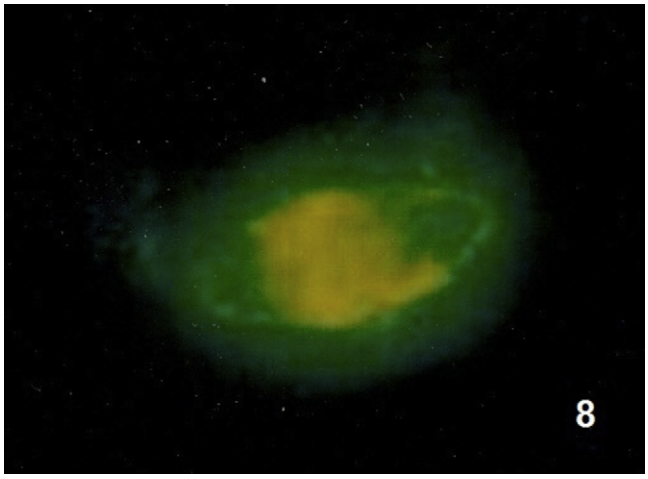
Methods: A total of 112 faecal specimens were examined by the conventional methods. Duplicate smears of the faecal concentrates, prepared by the formalin ethyl acetate procedure, were stained by the Kinyoun and the phenol-auramine stains.

Results: The Kinyoun's stain detected 22 positive coccidia specimens, while the phenol-auramine detected 24 positive specimens. The Kinyoun stain smears showed difficulty in interpretation, requiring examination of frequent fields at oil magnification, with possibility of misdiagnosis with artifacts. The phenol-auramine was extremely easy to read, thus examining fewer fields and requiring much less time, and the artifacts were readily recognizable. The cost of phenol-auramine reagents was much higher.



Phenol auramine stain shows oocyst of Cyclospora cayetanensis with several globular structures (X1, 000).

Conclusion: We concluded that although the overall ranking of both staining techniques was high; the phenol auramine was a more desirable test despite its higher cost.



Phenol auramine stain shows oocyst of Isospora belli with great fluorescence and inner protoplasmic mass (X1, 000).

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Can commercially available Dengue NS1 antigen kits be used for point-of-care testing (POCT) for dengue diagnosis?

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Background: Availability of point-of-care testing (POCT) can potentially improve the turnaround time of dengue diagnosis and aid clinical management. Detection of dengue non-structural protein 1 (NS1) antigen is available commercially but validation with whole blood samples to allow use in POCT rather than laboratory-processed serum/plasma is lacking. We assessed the potential of a commercially available NS1 kit for POCT.

Methods: The commercial NS1 kit was evaluated using whole blood from acutely febrile adults collected prospectively from Communicable Disease Centre, Singapore and primary care clinics. Each test strip was read independently by two readers. The results were compared to a suite of diagnostics tests (RT-PCR, NS1 antigen and IgM/IgG) conducted on the patients' plasma at the Environment Health Institute, Singapore. Patients were classified as dengue positive if dengue RNA or NS1 antigen were detected by the reference laboratory. Positive patients' samples were collected daily and tested by NS1-POCT until resolution of illness.

Results: From 06 Oct 2011 till 13 Jan 2012, 163 samples collected from 117 patients were tested. The median duration of fever at presentation was 4 days (range 1-12) and positive cases were followed up for a median of 2 days (range, 1-6). NS1-POCT demonstrated 89% sensitivity and 97% specificity compared to RT-PCR/NS1 for samples collected from patient on their first visit. When stratified by days post-fever at presentation, NS1-POCT demonstrated 92% sensitivity and 100% specificity for days 1-5. Sensitivity of 88% and specificity of 92% were obtained for days 6-12. Repeat NS1-POCT on positive subjects detected a median duration of NS1 antigenemia after fever onset of 8 days (range 4-10). Complete agreement between readers was noted in the interpretation of the commercial NS1-POCT results (Cohen's kappa = 1.0).

Conclusion: NS1 point-of-care testing with whole blood is feasible with good sensitivity and specificity compared to laboratory testing and no user-related misclassifications were found when performed by trained staff. 100% specificity was achieved when used between days 1-5 of illness presentation. It merits further investigation in a larger cohort in different health care settings.

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The sensitivity and specificity of serologic tests in the diagnosis of typhoid fever in adults: a meta-analysis

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Background: Typhoid fever is one of the most common infectious diseases in the world with up to 17 million cases and 600,000 deaths annually worldwide. With the growing body of evidence testing newer serologic tests developed to circumvent the problems of culture (time-consuming, requiring specialized personnel), this meta-analysis was done to evaluate and compare the diagnostic accuracy of these tes

Methods: All studies that were original articles with human subjects testing serologic tests wherein the gold standard utilized is isolation of the organism from the blood of host of medium to high quality were included. Random effects meta-analysis and hierarchical summary receiver operating characteristics curve were used to evaluate diagnostic accuracy

Results: A total of 12 studies evaluated the sensitivity and specificity of a single or a combination of the serologic tests. The pooled sensitivity and specificity of all the serologic tests are fair at 72% (0.70-0.74, 95% CI) and 78% (0.76-0.80, 95% CI) respectively. The pooled positive likelihood ratios for all the serologic tests are 3.52 (X2 = 648, p = 0.0) and the pooled negative likelihood ratio is 0.360 (X2 = 314.96, p = 0.0). The positive and negative likelihood ratios for dipstick (LR+ = 8.600, LR- = 0.248), Tubex (LR+ = 4.661, LR- = 0.256), Typhidot (LR+ = 5.753, LR- = 0.321), Widal test (LR+ = 2.034, LR- = 0.556) were calculated. Index tests with single studies (Typhidot-M, Mega Salmonella, Cromotest, ELISA and PCR) were not included in the calculation of likelihood ratios and ROC curves. The area under the curve for applicable index tests showed considerable differences with Tubex (AUC = 0.903) showing the greatest diagnostic accuracy than Typhidot (AUC = 0.836), dipstick (AUC = 0.806) and the least was Widal (AUC = 0.660).

Conclusion: The serologic tests studied in general have promising diagnostic accuracy in confirming typhoid fever; however this varies among the different index tests. Tubex was shown to have the overall greatest diagnostic accuracy compared to blood culture and should be used, and Widal was shown to have the least and should no longer be used.

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